

**Listing of Claims:**

1. (Currently Amended) A compact chemical reactor comprising:

a first substrate;

a second substrate attached to the first substrate;

5 a micro flow path which is defined between the first substrate and the second substrate and which has an end opening;  
and

a thin film heater provided in the flow path;

10 a wire connected to the thin film heater through the end opening of the flow path; and

a sealant which seals the end opening of the flow path.

2. (Currently Amended) The compact chemical reactor according to claim 1, wherein the flow path is defined by a groove provided in the first substrate and by a surface of the second substrate opposite to the groove; and

5 wherein the thin film heater is provided on the opposite surface of the second substrate that is opposite to the groove.

3. (Original) The compact chemical reactor according to claim 1, further comprising a catalyst layer provided in the flow path.

4. (Currently Amended) The compact chemical reactor according to claim  $\pm$  3, wherein the flow path is defined by a groove provided in the first substrate and by a surface of the second substrate opposite to the groove;

5        wherein the thin film heater is provided on the ~~opposite~~ surface of the second substrate that is opposite to the groove; and

wherein the catalyst layer is provided on a surface of the first substrate.

5. (Currently Amended) The compact chemical reactor according to claim  $\pm$  3, wherein the flow path is defined by a groove provided in the first substrate and by a surface of the second substrate opposite to the groove;

5        wherein the thin film heater is provided in the ~~opposite~~ surface of the second substrate that is opposite to the groove; and

wherein the catalyst layer is provided on a surface of the thin film heater.

6. (Currently Amended) The compact chemical reactor according to claim 1, wherein the flow path is defined by a groove provided in the first substrate and by a surface of the second substrate opposite to the groove;

5        wherein the thin film heater is provided on the ~~opposite~~  
surface of the second substrate that is opposite to the groove;  
      wherein a first catalyst layer is provided on a surface of  
the thin film heater; and  
      wherein a second catalyst layer is provided on a surface of  
10      the groove of the first substrate.

7. (Currently Amended) The compact chemical reactor  
according to claim 1, wherein the flow path is defined by a first  
groove provided in the first substrate and by a second groove  
provided in ~~the~~ a surface of the second substrate opposite to the  
5      ~~second~~ first groove;

wherein the thin film heater is provided on at least one  
of the second groove of the second substrate ~~or~~ and the first  
groove of the first substrate; and

wherein a catalyst layer is provided on at least one of the  
10      second groove of the second substrate ~~or~~ and the first groove of  
the first substrate.

8. (Currently Amended) The compact chemical reactor  
according to claim 1, wherein the flow path is defined by a first  
groove provided in the first substrate and by a second groove  
provided in ~~the~~ a surface of the second substrate opposite to the  
5      first groove; and

wherein the thin film heater is provided on at least one of the first groove of the first substrate ~~or~~ and the second groove of the second substrate.

9. (Currently Amended) The compact chemical reactor according to claim 1, wherein a catalyst layer is provided on ~~the~~ a surface of the thin film heater.

10. (Currently Amended) The compact chemical reactor according to claim 1, wherein the first substrate ~~has~~ includes a material having a thermal conductivity different from ~~the~~ a thermal conductivity of the second substrate.

11. (Currently Amended) The compact chemical reactor according to claim 1, wherein the thin film heater has an electrical resistive element which heats ~~by~~ in response to an applied voltage.

12. (Currently Amended) The compact chemical reactor according to claim 1, wherein a third substrate is provided on a surface of the first substrate which is opposite to ~~the~~ a surface of the first substrate that is attached to the second substrate;  
and

wherein another micro flow path is provided between the first substrate and the third substrate.

13. (Original) The compact chemical reactor according to claim 12, wherein the flow path between the first substrate and the third substrate overlaps at least in part the flow path between the first substrate and the second substrate.

14. (Currently Amended) The compact chemical reactor according to claim 12, wherein a first groove is provided in ~~the~~ a surface of the second substrate opposite to the first substrate; and

5        wherein a second groove is provided in the surface of the first substrate opposite to the third substrate.

15. (Currently Amended) The compact chemical reactor according to claim 12, wherein the thin film heater is provided on the surface of the first substrate facing the second substrate.

16. (Currently Amended) The compact chemical reactor according to claim 12, wherein a catalyst layer is provided on the surface of the first substrate ~~opposite to~~ facing the second substrate.

17. (Currently Amended) The compact chemical reactor according to claim 1, wherein a third substrate is provided on a surface of the first substrate which is opposite to a surface of the first substrate that is attached to the second substrate; and  
5        wherein a second micro flow path is provided between the first substrate and the third substrate; and  
         wherein a combustion catalyst layer which promotes a combustion reaction of a fluid flowing in the second flow path is provided in the second flow path.

18. (Currently Amended) The compact chemical reactor according to claim 1, wherein a third substrate is provided on a second surface of the first substrate which is opposite to a first surface of the first substrate that is attached to the  
5        second substrate; and  
         wherein the first substrate ~~is provided with~~ includes grooves respectively formed in the first surface and the second surface.

19. (Original) The compact chemical reactor according to claim 1, wherein the thin film heater generates heat to vaporize a fluid flowing in the flow path.

20. (Original) The compact chemical reactor according to claim 1, wherein a catalyst layer made of a catalyst which

promotes a reaction to reform a fluid flowing in the flow path into hydrogen is provided in the flow path.

21. (Original) The compact chemical reactor according to claim 1, wherein a catalyst layer including a catalyst which promotes a reaction to produce carbon dioxide from carbon monoxide flowing in the flow path is provided in the flow path.

22. (Currently Amended) A chemical reaction system comprising:

(a) a reaction section which includes:

a first substrate;

a second substrate attached to the first substrate;

a micro flow path which is defined between the first substrate and the second substrate and which has an end opening;  
~~and~~

a thin film heater provided in the flow path; [[,]]

a wire connected to the thin film heater through the end opening of the flow path; and

a sealant which seals the end opening of the flow path;

wherein the ~~reactor~~ reaction section reforms a fuel into hydrogen in the flow path; and

(b) a power generation section which generates electricity with using the hydrogen produced by the reaction section.

23. (Original) The chemical reaction system according to claim 22, wherein the reaction section includes a combustion section which propagates heat from fuel combustion to the reaction section.

24. (Currently Amended) A chemical reaction system comprising:

(a) a reaction section which includes:

a first substrate;

5 a second substrate attached to the first substrate;

a micro flow path which is defined between the first substrate and the second substrate and which has an end opening;  
and

a thin film heater provided in the flow path; [[,]]

10 a wire connected to the thin film heater through the end opening of the flow path; and  
a sealant which seals the end opening of the flow path;

wherein the ~~reactor~~ reaction section reforms a fuel into hydrogen in the flow path;

15 (b) a power generation section which generates electricity with using the hydrogen produced by the reaction section; and

(c) a load which ~~activates~~ is activated with electrical power generated by the power generation section.



25. (Currently Amended) The chemical reaction system according to claim 24, wherein the load ~~is~~ comprises a computer.

26. (Currently Amended) The chemical reaction system according to claim 24, wherein the load ~~is~~ comprises a telephone.

27. (Currently Amended) The chemical reaction system according to claim 24, wherein the load ~~is~~ comprises an image pickup device.

28. (New) A compact chemical reactor comprising:  
a first substrate;  
a second substrate attached to the first substrate;  
a micro flow path which is defined between the first  
5 substrate and the second substrate and which has an end opening;  
a heater for heating the flow path;  
a wire connected to the heater through the end opening of  
the flow path; and  
a sealant which seals the end opening of the flow path.

29. (New) A chemical reaction system comprising:  
(a) a reaction section which includes:  
a first substrate;  
a second substrate attached to the first substrate;

5           a micro flow path which is defined between the first  
substrate and the second substrate and which has an end opening;  
          a heater for heating the flow path;  
          a wire connected to the heater through the end opening  
of the flow path; and

10           a sealant which seals the end opening of the flow path;  
          (b) a power generation section which generates electricity  
using hydrogen produced by the reaction section; and  
          (c) a load which is activated with electrical power  
generated by the power generation section.

30. (New) A chemical reaction system comprising:

(a) a reaction section which includes:  
          a first substrate;  
          a second substrate attached to the first substrate;  
5           a micro flow path which is defined between the first  
substrate and the second substrate;  
          a heater for heating the flow path; and  
          a wire connected to the heater; and  
          (b) a heat insulating wall for covering the reaction  
10 section;  
          wherein the wire penetrates the heat-insulating wall.

31. (New) The chemical reaction system according to claim 30, wherein the reaction section further comprises a sealant for sealing an end of the micro flow path.

32. (New) The chemical reaction system according to claim 30, wherein a portion of the heat insulating wall through which the wire penetrates is sealed so that a gas does not leak between an inside and an outside of the heat-insulating wall.

33. (New) The chemical reaction system according to claim 30, wherein a pressure between the heat insulating wall and the reaction section is lower than atmospheric pressure.

34. (New) The chemical reaction system according to claim 30, wherein a space between the heat insulating wall and the reaction section is charged with an inactive gas.

35. (New) A chemical reaction system comprising:

(a) a reaction section which includes:

a first substrate;

a second substrate attached to the first substrate;

5 a micro flow path which is defined between the first substrate and the second substrate;

a heater which heats the flow path; and

a wire connected to the heater;

10 (b) a heat insulating wall which covers the reaction section  
and which is penetrated by the wire;

(c) a power generation section which generates electricity  
using hydrogen produced by the reaction section; and

(d) a load which is activated with electrical power  
generated by the power generation section.

36. (New) The chemical reaction system according to  
claim 35, wherein the reaction section further comprises a  
sealant which seals an end of the micro flow path.

37. (New) The chemical reaction system according to  
claim 35, wherein a portion of the heat insulating wall through  
which the wire penetrates is sealed so that a gas does not leak  
between an inside and an outside of the heat insulating wall.

38. (New) The chemical reaction system according to  
claim 35, wherein a pressure between the heat insulating wall and  
the reaction section is lower than atmospheric pressure.

39. (New) The chemical reaction system according to  
claim 35, wherein a space between the heat insulating wall and  
the reaction section is charged with an inactive gas.